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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/697,673	10/29/2003	Bo Pi	12227-065001	8389

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EXAMINER	
YAM, STEPHEN K	

ART UNIT	PAPER NUMBER
2878	

DATE MAILED: 08/23/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/697,673	PI ET AL.	
	Examiner	Art Unit	
	Stephen Yam	2878	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *1003*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1, 2, 4, 8, 9, and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lyons US Patent No. 6,650,799.

Regarding Claim 1, Lyons teaches (see Fig. 3) an optical sensing device and method for using a fiber sensor, comprising a fiber (16) having a side surface (24) (see Fig. 1) on fiber cladding (20) within an evanescent field (see Col. 4, lines 1-3, 31-35) of guided light in the fiber, a layer (26) formed on the side surface and having a thickness to transmit the evanescent field (see Col. 2, lines 57-60), an optical detector (67) to receive guided light in the fiber side passing through the side surface and to produce a detector output (68), and a processing circuit (64, 70) to measure an optical loss (see Col. 7, lines 35-38) of the guided light at the side surface from the detector output and operable to extract a property of the medium above the metal layer from the measured optical loss (see Col. 4, line 66 to Col. 5, line 13). Lyons does not teach the layer as a metal layer. It is well known in the art to construct a Bragg grating (the layer in Lyons) from metal, to provide effective diffraction effects. It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the layer as a metal layer in the device of Lyons, since it has been held to be within the general skill of a worker in the art to

select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. In re Leshin, 125 USPQ 416.

Regarding Claim 2, Lyons teaches the processing circuit comparing the measured optical loss to calibrated optical losses for different materials and identifies one material from the different materials as being present in the medium above the metal layer when the measured optical loss corresponds to a calibrated optical loss for the one material (see Col. 5, lines 3-9- there is inherently a calibrated value or range of which the detected value is compared to, for recognizing each of the different states).

Regarding Claim 4, Lyons teaches (see Fig. 6) a protective layer (156) over the metal layer (150).

Regarding Claims 8, 9, and 11, Lyons teaches the device in Claim 1, according to the appropriate paragraph above. Lyons does not teach a second embodiment of the elements of Claim 1, for measuring a second material. It is well known in the art to combine multiple sensors into a single device, for measuring multiple samples simultaneously. It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide two sensors of Lyons into a single, combined device, to provide simultaneous measuring of multiple materials to increase efficiency and productivity in a time-conscious environment.

3. Claims 5 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lyons in view of Schoch US Patent No. 4,637,729.

Regarding Claims 5 and 6, Lyons teaches the device in Claim 1, according to the appropriate paragraph above. Lyons does not teach the optical detector receives light at a first

wavelength in the guided light to produce a first detector output, and the device further comprises a second optical detector to receive light at a second, different wavelength in the guided light to produce a second detector output, wherein the processing circuit uses a ratio of the first and the second detector outputs to determine the measured optical loss at the side surface, with first and second optical filters to produce the light at the first and second wavelengths, respectively. Schoch teaches (see Fig. 1) a similar device, with an optical detector (61) receiving light at a first wavelength in the guided light to produce a first detector output, and a second optical detector (63) to receive light at a second, different wavelength (see Col. 5, lines 16-20, 47-51) in the guided light to produce a second detector output, wherein the processing circuit uses a ratio of the first and the second detector outputs to determine the measured optical loss at the side surface (see Col. 5, lines 31-37), with first and second optical filters to produce the light at the first and second wavelengths, respectively (see Col. 4, lines 21-24). It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the additional detection and processing as taught by Schoch in the device of Lyons, to provide a baseline reference to cancel the effects of contamination, providing more accurate measurement, as taught by Schoch (see Col. 5, lines 42-51).

4. Claims 1-3 and 7-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Vali et al. US Patent No. 5,164,608.

Regarding Claims 1 and 12, Vali et al. teach (see Fig. 1 and 3) a device and method for using a fiber sensor to measure material components in a material mixture, wherein the fiber sensor comprises a fiber (24) with a side surface on fiber cladding (see Col. 1, line 68 to Col. 2,

line 8) within an evanescent field (see Col. 1, lines 30-41) of guided light in the fiber, the method comprising contacting the fiber sensor with the material mixture under measurement so that the material mixture is present at the outside of the fiber, directing a probing light beam at a probing wavelength into the fiber to allow for a fraction (see Col. 1, lines 33-36) of the probing light beam to be coupled out of the side surface through the metal layer, measuring (30) an optical loss of the probing light beam output from the fiber (see Col. 2, lines 20-22), and using (see Col. 2, lines 21-24) the measured optical loss to determine at least whether a selected material component is present in the material mixture (see Col. 3, lines 65-68). Vali et al. do not teach a metal layer formed on the side surface and having a thickness to transmit the evanescent field. It is well known in the art to use shaped metal to selectively direct evanescent light emissions, to provide precise control of the output of light. It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide a metal layer formed on the side surface and having a thickness to transmit the evanescent field, in the method of Vali et al., to control the output of light from the fiber for increased detection sensitivity.

Regarding Claim 2, Vali et al. teach the processing circuit comparing the measured optical loss to calibrated optical losses for different materials and identifies one material from the different materials as being present in the medium above the metal layer when the measured optical loss corresponds to a calibrated optical loss for the one material (see Col. 3, lines 65-67).

Regarding Claims 3, 7, and 15, Vali et al. teach measuring a duration of the measured optical loss for the selected material to determine a percentage of the selected material present in the material mixture (see Fig. 3, 4 and Col. 3, lines 18-30, 42-68).

Regarding Claims 8-11, Vali et al. teach the device in Claim 1, according to the appropriate paragraph above. Vali et al. do not teach a second embodiment of the elements of Claim 1, for measuring a second material. It is well known in the art to combine multiple sensors into a single device, for measuring multiple samples simultaneously. It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide two sensors of Vali et al. into a single, combined device, to provide simultaneous measuring of multiple materials to increase efficiency and productivity in a time-conscious environment.

Regarding Claim 13, Vali et al. teach comparing the measured optical loss to a calibrated optical loss measurement for the selected material obtained at the same probing wavelength in making the determination (see Col. 2, lines 48-51 and Col. 3, lines 50-51, 65-68).

Regarding Claim 14, Vali et al. teach comparing the measured optical loss to a calibrated optical loss measurement for a second selected material obtained at the same probing wavelength to determine whether the second selected material is present in the material mixture (see Col. 3, lines 38-68).

Regarding Claims 16-19, Vali et al. teach the selected material as a gas ("air space"- see Fig. 1 and Col. 3, lines 51-53), water (see Col. 2, lines 11-13), an oil (see Col. 2, lines 11-13), or a liquid (see Col. 2, lines 11-13).

5. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Vali et al. in view of Schoch.

Regarding Claim 20, Vali et al. teach the method in Claim 12, according to the appropriate paragraph above. Vali et al. do not teach splitting the probing light beam output

from the fiber into a first beam at a first wavelength and a second beam at a second, different wavelength, wherein the measurement of the optical loss includes measuring an optical power level of the first beam, measuring an optical power level of the second beam, obtaining a ratio of optical power levels of the first and the second beams, and using the ratio to determine the measured optical loss. Schoch teaches (see Fig. 1) a similar method, with splitting the probing light beam output from the fiber into a first beam at a first wavelength and a second beam at a second, different wavelength (see Col. 4, lines 21-24), wherein the measurement of the optical loss includes measuring (61) an optical power level of the first beam, measuring (63) an optical power level of the second beam, obtaining a ratio of optical power levels of the first and the second beams (see Col. 5, lines 31-37), and using the ratio to determine the measured optical loss (see Col. 5, lines 49-51). It would have been obvious to one of ordinary skill in the art at the time the invention was made to It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the additional detection and processing as taught by Schoch in the method of Vali et al., to provide a baseline reference to cancel the effects of contamination, providing more accurate measurement, as taught by Schoch (see Col. 5, lines 42-51).

Conclusion

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Jones et al. US Patent No. 5,903,685 and Fischer et al. US Patent No. 5,168,156, teach fiber sensors using evanescent waves.

Murphy US Patent No. 4,386,269, teaches a fiber sensor detecting liquids.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stephen Yam whose telephone number is (571)272-2449. The examiner can normally be reached on Monday-Friday 8:30am-5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Porta can be reached on (571)272-2444. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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THANH X. LUU
PATENT EXAMINER